Skull more lightly built than in *R. angolensis*, but agreeing with it in all essential respects, such as the very slight deflection of the brain-case, the co-ossification of the premaxillæ, and the swollen supraorbital margins. Teeth of the same squarish form, but smaller throughout, and similar in relative proportions, with the exception that the last molar, both above and below, is very much smaller, about one-third instead of one-half the size of the tooth immediately preceding it.

Dimensions of the type (not fully adult) :—

Forearm 70 mm.

Head and body (c.) 112; tail 11; pollex (c. u.) 28·5; third finger, metacarpal 49·5, first phalanx 32·5, second phalanx 41; lower leg and hind foot (c. u.) 46.

Skull: greatest length 38·5; zygomatic breadth 20·5; supraorbital foramina to tip of nasals 18; breadth of brain-case 15; front of canine to back of m^3 14·8; p^4 2·3 × 1·8; m^2 1·4 × 1·2; p_4 2·7 × 1·7; m_3 1·3 × 1·1.

Hab. Sierra Leone.

Type. Nearly adult female. B.M. 8. 9. 11. 1. Collected and presented by Canon F. C. Smith.

The many important characters by which *Rousettus angolensis* differs from all other members of the genus have recently been brought out in Dr. K. Andersen's admirable notes on the group *, so that no comparison of *R. smithii* with other species is required. From *R. angolensis* it is at once distinguishable by its smaller size (allowing, of course, for the slight immaturity of the type), smaller teeth, and, especially, by its much smaller posterior molars.

I have much pleasure in naming this Rouset after its discoverer, to whom the National Museum is indebted for various acceptable specimens.

XLV.—*On the Dentition of the Diastema in some Fossil Reptiles referred to the Gomphodontia, from the Upper Karroo Rocks of Cape Colony.* By H. G. Seeley, F.R.S., F.G.S., King's College, London.

One of the notable features in the dentition of the fossil Reptilia which most closely resemble mammals is the toothless interval in the jaws between the canine and molar teeth. A similar toothless interspace is present in existing mammals,

* Ann. & Mag. Nat. Hist. (7) xix. pp. 501 *et seqq.* (1907).

so various as certain marsupials, chevrotains, horse, rhinoceros, pigs, rodents, so that no special importance can be claimed for the diastema in morphology or classification. Among some Mammalia there is evidence that the diastema is a consequence of shedding of deciduous teeth, as well as of the atrophy and suppression of teeth. There is reason for supposing that these fossil reptiles had a normal dental succession, in which a first or milk-series of teeth was followed by a permanent series; but there is no reason to believe that the reptilian teeth were pushed out and shed in quite the mammalian manner. The process of absorption of old teeth was carried much further in reptiles, and though no evidence has been seen of successional molar teeth among Theriodonts, the canines constantly have upon the roots unabsorbed portions of the teeth which preceded them, situate anteriorly in the mandible and posteriorly in the skull. This mode of succession may account for the occasional duplication of canine teeth, such as is found in *Cynognathus leptorhinus,* the one tooth being a milk-tooth, and the other permanent. There being no evidence of pushing out of the first set of teeth, which correspond to milk-teeth which are not replaced in mammals by permanent teeth, it follows that they can only disappear by a condition of weakness, feebleness as distinct from disease, which ensures inability to persist so well as the permanent molar teeth. The reptilian diastema therefore appears to be the portion of the alveolar border from which the crowns of teeth of the "milk-series" have crumbled away in the mature animal. Even with this suggested explanation there remains a short interval in the jaw without teeth behind the canine tooth which has to be accounted for. The teeth of the molar series in these fossil reptiles as they extend forward gradually diminish in size, exhibiting a species of atrophy; and it may be that nutrition fails as work diminishes, and teeth are never developed. Hence the reptilian diastema includes two elements—an anterior part, which originates in the mammalian way; and a posterior part, which illustrates the reptilian type of a false diastema, which may be regarded as a condition antecedent to the type which becomes developed as a true diastema in mammals.

In 1895, after discussing reptilian characteristics of the skull of *Tritylodon longævus* (Owen), I gave a figure (Phil. Trans. Royal Society, 1895 B, p. 1028, fig. 4) of the anterior extremity of the right ramus of the mandible of a Theriodont reptile as illustrating the kind of mandible which that genus might possess, and as indicating the possibility that the

reputed incisors of *Tritylodon* are canine teeth, the incisors being lost earlier than the middle incisors of *Gomphognathus polyphagus*. Professor H. F. Osborn states, in the 'American Naturalist' for May 1898, that I figured a portion of the lower jaw of *Tritylodon*; but no generic determination was made of that fossil.

The specimen belongs to a larger animal than *Tritylodon longævus*. The intractable matrix which obscured the alveolar border in the mandible has now been removed, and the jaw is referable to a species or subgenus of *Gomphognathus* near to *G. polyphagus*.

This mandibular fragment is $2\frac{1}{2}$ inches long from the incisor teeth to the first molar tooth. It is separated from the missing left ramus by fracture, but the rami were united by close bony union, and the socket of the first incisor of the left ramus remains with this specimen. The crown of that tooth may have perished during the life of the animal, though the larger part of the root remains, shown in a vertical fracture. The symphysial surface, about $1\frac{1}{2}$ inch long, 1 inch deep in front, and $\frac{3}{4}$ inch deep posteriorly, was of long ovate form.

The inferior external surface of the jaw is convex from front to back, and from side to side slightly convex in front but somewhat flattened. This convex chin surface makes an angle with the relatively vertical external lateral surface, which is gently convex from above downward. The lateral surface is $\frac{3}{4}$ inch deep at the canine tooth and increases in depth as it extends backward. The internal surface of the jaw above the symphysis is a channel, nearly straight from front to back, sunk well below the level of the canine and the anterior half of the diastema.

The three incisor teeth are close-set. They occupy a width of half an inch. The crowns are broken, but they are nearly uniform in size, nearly circular, with a slight transverse natural compression. The third incisor is in front of the canine. The second and first incisor teeth are further forward successively, so as to make a curved external contour, much in the manner of *Gomphognathus kannemeyeri*, which is the only species with the mandible separated from the skull.

The canine tooth is directed upward and forward, and not outward as in *G. kannemeyeri*, so that there is no appreciable lateral bulbous expansion of the extremity of the mandible as in that species. The tooth is strong, laterally compressed, ovate in transverse section on the broken surface, $\frac{9}{20}$ inch from front to back at the fracture, and $\frac{1}{4}$ inch wide, but slightly wider anteriorly. What remains of the external

enamel, badly preserved, appears to be wrinkled. Below the middle of the canine tooth a shallow groove descends the external lateral surface of the dentary bone.

Behind the socket for the canine tooth a concave diastema measuring $1\frac{7}{10}$ inch intervenes between that tooth and the first tooth of the molar series. The crown of that molar stands fully $\frac{1}{4}$ inch above the alveolar margin. It is subquadrate, somewhat broken, less than $\frac{1}{4}$ inch in diameter, with external and internal ridge-margins in front. It is worn down transversely by apposition with a maxillary tooth to make a flat grinding surface. The posterior fracture terminating the fragment of the ramus, passes vertically through the vacant socket for the second molar tooth, which is about $\frac{9}{10}$ inch deep in the jaw and tapers as it descends.

The diastema is the most interesting region of the jaw, on account of its length, for in *Gomphognathus kannemeyeri* the concave interspace in the jaw between the mandibular canine and molars measures less than $\frac{4}{10}$ inch, which is less than one-fourth as long as in this specimen. In *Gomphognathus polyphagus*, in which the jaws are closed, the mandibular diastema measures $1\frac{3}{10}$ inch.

The region of the diastema is compressed from the outer to the inner side, so as to make a blunt alveolar ridge situate towards the flattened inner side of the ramus, wider behind than in front. This ridge helps to define the convexity of the external surface of the dentary bone.

On carefully cleaning the summit-line it became evident that the ridge of the diastema carries teeth. Their crowns are level with the alveolar ridge or imperceptibly raised, and give no indication of having been more elevated. They have the aspect of flattened ovate denticles each with a central depression, occupied with black matrix, situated in advance of the molar teeth. They therefore appear to correspond in position with the milk-teeth of mammals, in which the teeth are shed and not replaced, but differ in being persistent in the jaw and in their simple condition and small size.

The teeth which are most evident are three in number, raised above the bone by the thickness of a stout paper, and defined at the base by a black line of matrix. It was necessary to determine whether they were superficial ossifications. I reluctantly sacrificed a part of the hindermost denticle, but under the steel point the whole crown became dissipated, displaying black matrix in the centre and an osseous rim. On scraping away the matrix no doubt is left that the root of the tooth is still in its socket, margined externally by dense white tissue, continuous with a minute fragment of the

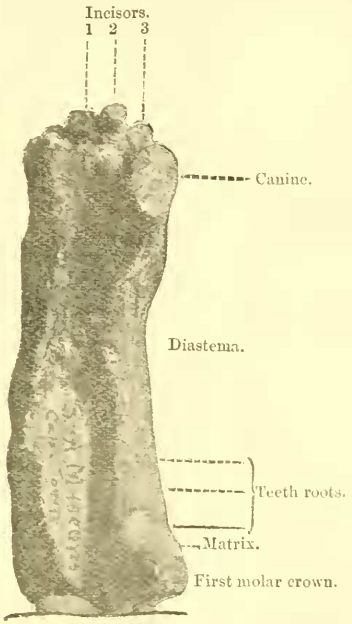
original crown. The area of the pulp-cavity is occupied with soft substance of the bluish-grey colour of the matrix, which may possibly show a radial structure. The teeth thus demonstrated increase in size posteriorly, where the diameter is about $\frac{3}{10}$ inch. There may possibly have been as many as four, but it is difficult to distinguish more than three, because they are level with the surface of the jawbone. The inference seems legitimate that these teeth originally possessed sharp elevated conical crowns, however unexpected it may be that all the crowns should disappear during life so as to extend the length of the diastema, leaving only polished dental surfaces of the same height as the alveolar ridge, which holds their roots.

In *Gomphognathus kannemeyeri* the condition is so dissimilar as to suggest a generic difference, for behind the short mandibular diastema of $\frac{4}{10}$ inch the teeth are all of the same stout type and contribute to form the grinding molar surface, though only the middle part of the mandibular armature is worn. They are similar to each other and not of a kind to be easily broken, and are packed in the closest possible succession. I have distinguished the first four as premolars and the remaining nine as molars, but there is no marked difference. There are only nine functional maxillary molars in *Gomphognathus* and allied genera, so that the thirteen teeth in the mandible of *G. kannemeyeri* must either indicate that the series is extended forward by teeth which are homologous with the small decollated teeth now described, or that *G. kannemeyeri*, the type of the genus, must be separated from the other species. The former alternative is preferable, in the absence of further evidence, but it requires that the premolars of the young *G. kannemeyeri* should be classed in the same category with the teeth in the diastema which are lost in this specimen. They are probably a part of the first series of teeth without masticatory function.

The maxillary dentition is only known in *Gomphognathus polyphagus*. In the original description (Phil. Trans. Roy. Soc. B, 1895, p. 18) the maxillary diastema is described as raised a little above the palate and prolonged backward by the curve of [six] small premolar teeth contained in a length of half an inch. It is remarked that the first on the left side appears to be worn down with use, but all the other teeth on a level with the maxillary bones are broken or lost. It is not possible now to determine whether the breakage took place during life or during the removal of the matrix, as seems probable. Their surfaces are certainly fractured by the chisel, and in that respect are unlike the larger teeth in the

mandible, described in this notice. In any case, it may be inferred that the crowns of the teeth, indicated by the circular outlines of their roots, were slender, sharp, and conical, in striking contrast with the masticating molars behind, and equally in contrast with the corresponding teeth of *G. kannemeyeri*.

A more instructive dental condition is seen in the skull, probably of the same species of *Gomphognathus*, which I found at Lady Frere, indicated as R. 2578 in the British Museum.



Right ramus of mandible of *Gomphognathus* (*Diastemodon*) *dimorphodon*, seen from above, showing extent of symphysis and roots of teeth in the diastema.

In the middle of the maxillary diastema on the left side, behind the canine tooth is one crown quite perfect, small, strong, sharply pointed, recurved, which may be an early premolar. It is the type of cutting prehensile crown which may have existed in the specimen of *G. polyphagus* from the same locality, numbered in the Brit. Mus. 2576–7, and may have been present in the allied species indicated by this fragment of the right mandible. The bases of these teeth are

badly exposed in all the specimens. This species, defined by larger size, longer diastema, larger ovate roots of the decollated teeth, and relatively less depth of the jaw, is provisionally indicated as *Gomphognathus* (*Diastemodon*) *dimorphodon*. The differences from *Gomphognathus kannemeyeri* in the types of premolar teeth conveniently separate *G. polyphagus* and this species as the subgenus *Diastemodon*.

The figure is of the natural size and shows the aspect from above. The specimen is in the South-African Museum, Cape Town. I am indebted to the Trustees for the opportunity of making this further examination of the fossil.

XLVI.—*Notes on the* Forficularia.—XIV. *A Revision of the* Pygidicraninæ. By Malcolm Burr, B.A., F.E.S., F.L.S., F.Z.S., &c.

Most of the species referred to in the following notes have been hitherto included in the capacious genus *Pygidicrana*, Serville. An examination of the material in my own collection, with a view to revising the somewhat arbitrary arrangement of de Bormans, has induced me to establish some new genera, based chiefly on characters which have not hitherto been employed in this genus.

The group-name was invented by Verhoeff, who divided it into Pygidicraninæ for the type genus and Pyragrinæ for *Pyragra*, *Echinosoma*, and perhaps *Echinopsalis*. These last genera are not discussed in these pages. They represent the transition towards *Labidura*. The femora are neither compressed nor keeled, the elytra are stronger at the axillary angle, and consequently the scutellum is only present as an exception in *Pyragra* and never in the other genera, in which the pronotum extends well over the insertion of the elytra. *Pyragra* is in many respects undoubtedly allied to *Pygidicrana*, but *Echinosoma* shows the transition through *Echinopsalis* to *Psalis*, *Labidura*, and *Anisolabis*.

In the Pyragrinæ the pronotum is always transverse, in the Pygidicraninæ never.

An important generic character, which will be of undoubted use in the future, is the form of the sternal plates *, especially of the lobe of the metasternum.

* The value of these shields as a generic character was appreciated by Scudder in 1876, though he failed to make very much use of them.